AMENDMENTS TO CLAIMS

I claim:

1. (Currently amended) A oligonucleotide-based surface-enhanced Raman spectroscopy molecular probe (SMP), comprising:

at least one solid nanoparticle comprising an elemental metal, said nanoparticle having [[an]] a nanostructured outer surface that is surface-enhanced Raman spectroscopy (SERS) active, and

at least one pin loop, said pin loop including a loop sequence complementary to at least one target sequence, a first stem attached to one end of said pin loop having at least one SERS active label attached thereto and a second stem attached to the other end of said pin loop and said nanoparticle, wherein said probe generates a stronger SERS signal upon irradiation with excitation radiation when not bound to said target sequence as compared to a SERS signal following hybridization of said probe with said target sequence.

2. (Previously presented) The SMP of claim 1, wherein said surface comprises said elemental metal.

3. (Currently amended) The SMP of claim 1, wherein said nanoparticle ~~is~~ consists entirely of said metal.

4. (Original) The SMP of claim 1, wherein said at least one pin loop comprises a plurality of said pin loops, said plurality of pin loops bound to at least one of said nanoparticles, said plurality of pin loops providing at least two different of said loop sequences for simultaneously detecting a plurality of said target sequences.

5. (Original) The SMP of claim 1, wherein said at least one nanoparticle comprises a plurality of said nanoparticles bound to one another.

6. (Original) The SMP of claim 5, wherein said nanoparticles are bound to one another by DNA strands or thiol chemistry.

7. (Original) The SMP of claim 1, wherein said at least one SERS active label comprises at least a first and second SERS label, said first and second SERS label providing different emission characteristics.

8. (Previously presented) The SMP of claim 1, wherein said elemental metal comprises Cu, Ag or Au.

9. (Previously presented) The SMP of claim 1, wherein said SMP includes a bioreceptor attached thereto, said bioreceptor comprising at least one selected from the group consisting of an antibody, a protein, a gene, a biomimetic, an enzyme, a cell receptor and an intact biological cell.

10. (Currently amended) A Raman detection system, comprising:

at least one excitation light source for providing excitation radiation, and

at least one oligonucleotide-based surface-enhanced Raman spectroscopy molecular probe (SMP), said SMP comprising at least one solid nanoparticle comprising an elemental metal, said nanoparticle having [[an]] a nanostructured outer surface that is surface-enhanced Raman spectroscopy (SERS) active, and at least one pin loop, said pin loop including a loop sequence complementary to at least one target sequence, a first stem attached to one end of said pin loop having at least one SERS active label attached thereto and a second stem attached to the other end of said pin loop and said nanoparticle, wherein said probe generates a stronger SERS signal upon irradiation with excitation radiation when not bound to said target sequence as compared to a SERS signal following hybridization of said probe with said target sequence.

11. (Original) The system of claim 10, further comprising a detection system communicably connected to said SMP for detection of SERS signals emanating from said SMP.

12. (Original) The system of claim 10, wherein said at least one SMP comprises a plurality of SMPs, said plurality of SMPs bound to a solid sampling platform.

13. (Original) The system of claim 11, wherein said detection system comprises at least one selected from the group consisting of a photomultiplier, a charge-coupled device (CCD), a charge injection device (CID), photodiode, phototransistor and avalanche diode.

14. (Previously presented) The system of claim 11, wherein said surface comprises said elemental metal.

15. (Original) The system of claim 14, said at least one SMP comprises a plurality of SMPs, wherein said detection system provides a separate photodetector channel for receipt of SERS signals emanated from each of said plurality of SMPs.

16. (Original) The system of claim 11, wherein said at least one probe comprises a plurality of probes, said plurality of probes disposed in solution.

17. (Original) The system of claim 11, further comprising structure for application of energy sufficient to kill selected cells in a location proximate to any of said plurality of probes following detection of said target within a body.

18. (Original) The system of claim 17, wherein said selected cells comprise cancer cells.

19. (Original) The system of claim 11, wherein said at least one probe comprises a plurality of probes, said system further including a microfluidic system having a plurality of microfluidic channels, said microfluidic system for directing samples through said microfluidic channels to said plurality of probes.

20. (Original) The system of claim 19, wherein said microfluidic system comprises at least one selected from the group consisting of a capillary electrophoresis array, a liquid chromatography array, a gas chromatography array, and a lab-on-a-chip system.

21. (Original) The system of claim 11, wherein said at least one pin loop comprises a plurality of said pin loops bound to said nanoparticle, said plurality of pin loops providing at least two different of said loop sequences for simultaneously detecting a plurality of target sequences.

22 – 33 (Cancelled)

34. (New) The SMP of claim 1, wherein said nanoparticle has a diameter from about 10 nanometers to 100 nanometers.

35. (New) The SMP of claim 1, wherein said outer surface provides a Raman enhancement of at least 10^6.

36. (New) The SMP of claim 1, wherein said outer surface provides a Raman enhancement of at least 10^{10}.

37. (New) The system of claim 10, wherein said nanoparticle has a diameter from about 10 nanometers to 100 nanometers.

38. (New) The system of claim 10, wherein said outer surface provides a Raman enhancement of at least 10^6.

39. (New) The system of claim 10, wherein said outer surface provides a Raman enhancement of at least 10^{10}.